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## **Again Let's Look Before We Leap: The Effects of Physical Activity on Smoking and Drinking Patterns**

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### **ABSTRACT**

The use of jogging and other types of vigorous physical activities are becoming increasingly popular alternative programs for the prevention of drug and alcohol abuse problems in many communities and schools. The drinking and smoking patterns of a group of university students participating in active endurance and in passive participatory types of exercises were examined before and after a 15-week period of engaging in the activities three times a week at 40 minutes a day. The results of this study indicate no change in either smoking or drinking patterns for either group at the end of the 15-week period. Perhaps other factors than just vigorous exercise are important for changes in drinking and smoking patterns such as a conscious commitment to changing life styles. The authors suggest that before alternative methods such as physical activities are introduced into the schools and communities as drug and alcohol abuse prevention programs that they first be evaluated as to their effectiveness.

### **Introduction**

The use and abuse of alcohol and tobacco continues to be a problem in our society. Thousands of people each year are affected by diseases related to the use of these products or social problems resulting from their abuse. Cigarette smoking continues to affect individuals by causing increased risk of heart disease, chronic pulmonary functioning problems and cancer. Alcohol abuse results in fatal traffic accidents, loss of production on the job, family discord and crime, not to mention diseases such as cirrhosis and early death from the toxic effect of overuse of the product. In an attempt to minimize the problems and risks associated with the use of these substances, a variety of educational programs have been initiated throughout the years in the schools, community and public and private agencies. These programs have utilized a variety of methods and techniques in hopes of increasing knowledge and changing attitudes leading to more responsible choices concerning the use of these substances. For these different educational programs, five basic models have been used. None of these models, however, has been established to be definitely effective in changing smoking or drinking patterns.

1. Abstinence Model. A common model of both alcohol and smoking education for many years has been the "Don't do it" approach. There is an assumption among educators and others that if you tell students not to drink or smoke for moral, religious, health or other reasons they will abstain. The fear technique where decayed lungs and skid row alcoholics are depicted is often used in this approach. Of course, prohibition showed that this method of education and control for the majority of people is not very effective and in fact may even cause further problems." Unfortunately this approach is still found today in educational programs and textbooks but appears to have little effect in changing drug use patterns.(21)

2. Social-Economic Model. This model gives statistics on a variety of problems encountered when people drink or smoke irresponsibly. In the case of alcohol abuse, crime rates, absenteeism, economic losses, traffic fatalities, divorce and child abuse problems are often discussed. To persuade people not to begin smoking or to give up the habit, loss of production due to more frequent respiratory infections and illnesses, chronic diseases and the expense of smoking to the individual and to society are often presented. However, giving facts about the cost of consumption of these products in terms of economic loss to the nation or increased illness to the individual rarely induces him to give up his habit. (15, 19, 28)

3. Alcoholism Model. There have been a number of alcohol education programs and published materials which have suggested that if you drink you will become an alcoholic. Very little is said about the positive aspects of alcohol and drinking in our society or that most individuals who drink do so in a responsible manner.(16)

4. Responsible Drinking/Smoking Model. The concept of responsible drinking for those who choose to drink and of making responsible choices about drinking or smoking is a more positive approach to alcohol/smoking education than the first three models. This approach focuses on teaching people, through values clarification exercises and problem solving skills, how to make decisions for responsible choices concerning drinking and smoking and for the responsible use of these substances if they choose to use them. The results of this approach at present are still mixed as to their effect on drinking and smoking patterns. (1, 11, 12, 20, 36)

5. Alternative Model. The alternatives approach is based on the premise that if individuals can get "turned on" to activities such as hobbies, recreational sports, jogging; the amount of drinking, drug use, and smoking will decrease. In some cases this approach has been successful but in others, once the alternatives are no longer available, individuals often go back to the same drinking and smoking patterns as their attitudes concerning the substances usually have not been changed. (2, 3, 4, 5)

None of these models has given a definitive conclusion as to the reduction of alcohol and smoking abuse in our culture. Some of these approaches work for small groups of people with similar values, but most have been failures from an educational point of view. With these models in mind it is important to examine their various ramifications, which became popular from time to time, to ascertain their effectiveness in helping individuals gain more positive and healthier

lifestyles. Sometimes a model becomes popular and a "band wagon" effect occurs without the technique being thoroughly tested. To develop a successful educational program, Globetti (19) suggests that the program must be directed and accepted by the intended audience and Engs suggests that it be tested before it is placed wholesale into the schools and community.

Currently a model in the schools and the community is the use of alternatives leading to more positive lifestyles. Individuals are encouraged to participate in vigorous sports and recreational activities such as jogging, and some individuals have reported change in smoking and drinking patterns and a decrease in anxiety and depression after partaking in various exercise programs. (4, 5) However, research in the area of reducing negative lifestyle behaviors and the anxieties of daily living by exercise has not been fully explored.

It is thought that individuals in the process of interacting with their environment are exposed to, and at times overwhelmed by, the stresses of daily living which produces negative mental states, such as anxiety and depression. In order to reduce these unpleasant feelings. excessive drinking, drug dependency, smoking or overeating and other negative lifestyle behaviors often occur.

The use of alcohol is generally thought to reduce tensions and to facilitate relaxation by many members of our society. (8, 35) This assumption was scientifically postulated by Congers (9) in his "Tension Reduction Hypothesis" (TRH) which claims that people use alcohol to relieve tension and anxiety. He felt that the effect of relaxation after drinking was positively reinforced making the habit, as in the case of alcoholism, extremely difficult to terminate.

Smoking has also been thought to be used as a method for tension reduction and promoting relaxation, largely by its psychological effect. Nesbitt (29) reported that subjects claimed feelings of relaxation and calmness even though they measured elevated levels of arousal. In a study comparing smoking patterns of subjects under high and low stress situations, Schacter et al. (34) found that smokers. especially heavy smokers. smoked more and inhaled more times under the high stress situation.

The attempts to inspire people to cope with daily stresses through more healthy and less destructive means has become popular in many segments of society. Sports. meditation, yoga, and biofeedback have become popularized by the mass media and many have gained support from the scientific communities. Some of these programs have become so popular that they are being used in the classroom to help prepare students to reduce the stresses in their life. (6, 17)

The benefits of vigorous exercise and physical activity have been thought to be an effective means for improvement in both physical and psychological states. To attain these improvements. it is thought that a person must engage in an activity having the "training effect" such as endurance sports of running, jogging and conditioning exercises. According to Pollock (31) this effect occurs when a person engages in activities which require 50-80% maximum

capacity for 20 to 40 minutes three or four times a week. It is thought that this effect may be the factor which causes changes in various physical and psychological states.

In the past few years much attention has been given to the psychological benefits of vigorous exercises such as jogging. Morgan (27, 28) has reported reduction of state anxiety (transitory) following a vigorous workout along with subjective feelings of psychological well being. Seeman (32) reported that these feelings lasted 2 to 5 hours for adult joggers. Several studies have also been done on the effects of psychological well being after long term, chronic exercise programs. States of anxiety and depression have been shown to improve after several months of physical training. However, most of these investigations have used highly anxious, older, and clinic populations.

There have been a number of claims stating that when a person participates in vigorous physical activity programs such as jogging, swimming, and raquetball, combined physiological and psychological changes occur which helps the person alter his/her life style resulting in the elimination of unhealthy self-defeating behaviors including drug and alcohol abuse. Hayes and Tevis (21) found that athletes, as compared to non-athletes, had better attitudes towards alcohol and fewer alcohol abuse problems. Bieners found that a group of boys participating in sports were less likely to drink and smoke compared to a group that was not as active in physical activities in a study lasting several years. Vigorous activity has been used in some drug treatment communities and has been found to cause both physiological and psychological improvements. However, little research has been done on the effect of exercise on drinking and smoking patterns among non-athletes.

### **Purpose of the Study**

Research in the area of exercise as a manifestation of the Alternatives Model of prevention of negative life style behaviors such as alcohol and smoking abuse is very limited. If anxiety and stress are, in fact, a significant cause for these and other negative health behaviors, vigorous exercises such as jogging might be a viable alternative for these negative life style behaviors. However, this model first needs to be tested before it is introduced into the schools and the community as the new alcohol, drug, and smoking education program.

It was the purpose of this investigation to determine the effect of jogging and physical conditioning exercises, on the smoking and drinking patterns of university students enrolled in physical activity courses at a large midwestern university. The results of this study could provide information on the effect of such activities over several months' period of time and aid in educational curriculum and program planning.

### **Procedures**

All undergraduate students enrolled in the introductory individual "endurance" activities of jogging and conditioning exercises during the academic year 1978-1979 at Indiana University were

asked to participate in the study. For the control group all students who were enrolled in the "participatory" activities of riflery, archery, and billiards were likewise asked to participate in the study.

Individual activities as opposed to team sport activities were used in this study in order to eliminate the possible effect of competitive team sports on drinking and smoking patterns. Students enrolled in other physical activity classes or who regularly engaged in physical activities or recreational sports once a week or more were excluded from the sample.

Students participated in the activities three times a week for 40 minutes, leading to the basic assumption that individuals participating in the endurance activities increased their physical fitness and underwent the training effect while those in the participatory activities did not.

Both the pre and post test questionnaires were administered at the beginning of the class period before students participated in the activity so as to eliminate possible immediate effects of the activity on state anxiety levels. The sample which completed both the pre and post testing contained 155 students in the participatory activities and 135 individuals in the endurance classes. To obtain an equal number of subjects in each group for analysis, one hundred subjects were randomly selected from both the participatory group and the endurance group.

The six behavior questions from the Student Alcohol Questionnaire's used to determine the quantity-frequency level of drinking at the beginning and at the end of the semester were used. (13, 14, 20, 25) The six levels of drinking from this include: Abstainer, drinking less than once a year or not at all; Infrequent Drinker, drinking at least once a year but less than once a month; Light Drinker, drinking at least once a month but not more than 1 to 3 drinks at any one sitting; Moderate Drinker, drinking at least once a month with no more than 3 to 4 drinks; Moderate/Heavy Drinker. drinking 3 to 4 drinks at least once a week or 5 or more drinks at least once a month; Heavy Drinker. drinking once a week or more, 5 or more drinks per sitting.

To determine the level of smoking, the subjects were asked if they smoked a pack (20 cigarettes) or more a day, a half pack (10 cigarettes) a day, up to 5 cigarettes a day, up to 5 cigarettes every few days, or did not smoke. Since numerous previous studies have indicated differences between females and males in knowledge, attitudes and behaviors concerning various substances, the results for males and females were analyzed separately. (11, 12, 14, 20, 25)

## **Results**

A Friedman's Analysis of Variance for Ordinal Data, comparing the difference in rankings between two groups of the same population to determine whether there is any consistent relational patterns among the variables. was used. The procedures contained in the Statistical Package for the Social Science computer program for this analysis was used. The results of this study show that 76% of all females and 89% of all males drink at least once a year and that 10%

of all females and 21 % of all males would be considered as heavy drinkers. The drinking patterns for males and females at the beginning and end of the semester for the participatory and endurance group are found in Table 1. The results of this study also show that 21% of all females and 22% of all males smoke at least 5 cigarettes every few days and that 6% of all females and 8% of all males smoke 20 cigarettes or more per day. The smoking patterns for males and females at the beginning and end of the semester for the participatory and endurance groups are found in Table 2. The Friedman's Chi Square between the endurance activity and the control participatory activity groups showed no significant difference between the two groups in regards to either drinking or smoking patterns for males and females on the pre test. This indicated that both groups were of the same population (Table 3). Likewise, within the endurance and control participatory groups there was no significant difference at the beginning or end of the semester in drinking and in smoking patterns (Table 4).

**TABLE 1**  
**Comparison of Pre and Post Test Drinking Patterns**  
**of the Two Activity Groups for Females and Males**

	Participatory Activities							
	Females				Males			
	pre test		post test		pre test		post test	
	N	%	N	%	N	%	N	%
Abstain	14	28.0	15	30.0	3	6.0	7	14.0
Infrequent	4	8.0	4	8.0	3	6.0	2	4.0
Light	5	10.0	6	12.0	5	10.0	3	6.0
Moderate	10	20.0	10	20.0	9	18.0	7	14.0
Mod/Heavy	12	24.0	8	16.0	18	36.0	19	38.0
Heavy	5	10.0	7	14.0	12	24.0	12	24.0

  

	Endurance Activities							
	Females				Males			
	pre test		post test		pre test		post test	
	N	%	N	%	N	%	N	%
Abstain	9	18.0	8	16.0	7	14.0	6	12.0
Infrequent	4	8.0	4	8.0	4	8.0	8	16.0
Light	7	14.0	6	12.0	6	12.0	5	10.0
Moderate	14	28.0	15	30.0	5	10.0	12	24.0
Mod/Heavy	11	22.0	10	20.0	19	38.0	9	18.0
Heavy	5	10.0	7	14.0	9	18.0	10	20.0

## Discussion

The results of this study appear to indicate that 15 weeks of vigorous physical activity for 40 minutes three times a week as part of university physical activity classes had no effect on the smoking and drinking patterns of the university students in this sample. Recently the alternative model of using jogging and exercise has become popular in the school and community for

prevention of alcohol. smoking and drug abuse. However, the results of this study appear to suggest that this model may not be effective for this age group in changing drinking and smoking patterns.

The reason people use and abuse alcohol, tobacco, and other drugs is thought by most individuals to be rather complex. Perhaps a simplistic approach to the problem such as using alternative activities like exercise has little effect on many individuals. In this study the students were engaged in physical activity for 40 minutes three times a week and it is assumed that a training effect took place. It is this effect which is assumed to produce changes in physiological and psychological states. Several studies have indicated that individuals who jog and engage in other vigorous activities over a period of time report less anxiety and use alcohol and tobacco less frequently. However, many of these reports have indicated that the persons involved in these studies had a mental set to change their whole life style into a more healthy and positive one and were not just partaking in course activities. Perhaps it is the psychological involvement and commitment to better health, along with the exercise. which causes individuals to report better mental health and less drug use and abuse. It may be that for change to occur in patterns of substance use and abuse that it is important for individuals to consciously make an effort to alter their whole life style and not just to exercise several times a week.

**TABLE 2**  
**Comparison of Pre and Post Test Smoking Patterns**  
**of the Two Activity Groups for Females and Males**

	Participatory Activities							
	Females				Males			
	pre test		post test		pre test		post test	
	N	%	N	%	N	%	N	%
Don't smoke	35	70.0	29	58.0	37	74.0	33	66.0
Up to 5 every few days	5	10.0	9	18.0	4	8.0	5	10.0
Up to 5 every day	3	6.0	2	4.0	1	2.0	3	6.0
10 per day	2	4.0	3	6.0	1	2.0	3	6.0
20 or more per day	5	10.0	7	14.0	7	14.0	6	12.0

  

	Endurance Activities							
	Females				Males			
	pre test		post test		pre test		post test	
	N	%	N	%	N	%	N	%
Don't smoke	44	88.0	42	84.0	41	82.0	39	78.0
Up to 5 every few days	3	6.0	4	8.0	4	8.0	4	8.0
Up to 5 every day	1	2.0	1	2.0	2	4.0	2	4.0
10 per day	1	2.0	1	2.0	2	4.0	4	8.0
20 or more per day	1	2.0	2	4.0	1	2.0	1	2.0

As part of this present investigation, and reported elsewhere, 10 the authors also examined the anxiety scores of these subjects at the beginning and end of the semester and found no significant change in scores in either the participatory or endurance activity groups. If in fact



individuals use and abuse alcohol and tobacco to reduce tensions and anxieties, perhaps the lack of anxiety reduction in this sample resulted also in no change in drinking and smoking patterns. However, the anxiety reduction hypotheses of why people use and abuse alcohol and tobacco is still fraught with conflicting results and more research needs to be done in this area before definitive answers can be forthcoming.

**TABLE 3**  
**Initial Comparison of Rankings Between Endurance and Participatory Activity Group on Drinking and Smoking Behaviors Using Friedman's Analysis of Variance**

	No. of subjects	Mean rank participatory group	Mean rank endurance group	df	Chi-square	Sig
<i>Females</i>						
Drinking patterns	50	1.050	1.50	1	.00	1.0
Smoking patterns	50	1.49	1.51	1	.01	.92
<i>Males</i>						
Drinking patterns	50	1.5	1.49	1	.001	.92
Smoking patterns	50	1.51	1.49	1	.008	.92

**TABLE 4**  
**Comparison of Pre and Post Test Rankings for Participatory and Endurance Activity Groups for Drinking and Smoking Patterns**

	No. of subjects	Mean rank pre-test	Mean rank post-test	df	Chi-square	Sig
<i>Females</i>						
<i>Drinking patterns</i>						
Participatory group	50	1.45	1.55	1	1.5	.49
Endurance group	50	1.18	1.14	1	.02	.88
<i>Smoking patterns</i>						
Participatory group	50	1.52	1.47	1	.18	.67
Endurance group	50	1.53	1.48	1	.08	.78
<i>Males</i>						
<i>Drinking patterns</i>						
Participatory group	50	1.51	1.49	1	.02	.88
Endurance group	50	1.19	1.20	1	.08	.78
<i>Smoking patterns</i>						
Participatory group	50	1.56	1.44	1	.72	.39
Endurance group	50	1.19	1.23	1	.01	.89

Another reason for no significant change in drinking and smoking patterns after 15 weeks of exercise might be the factor of age. Studies have shown that it is generally older adults or clinic populations which usually gain more positive mental health and life styles after exercise, while young adults and university students with little anxiety show little change. Perhaps young healthy university students smoke and drink for a variety of reasons including peer pressure, the need to prove masculinity and adult status and not just to reduce the tensions and anxieties of daily living. (19, 22, 25)

Though the results of this study cannot be generalized to university or other youth, it might suggest that individuals who are implementing jogging and other programs in substance abuse prevention programs in the school and community evaluate the outcome of these programs to see if any change in behaviors as far as substance use and abuse occurs. It is also recommended that further studies be accomplished in this area to determine what kind of people can best benefit from exercise as an aid in positive life styles changes. what age groups are most affected by exercise as a possible alternative to substance uses and abuses and whether or not the individual must consciously be aware that they are exercising for more positive life styles rather than just incidently participating in the activity.

## **Summary**

Jogging and vigorous exercises have begun to be increasingly used as alternative activities in alcohol, drug, and smoking abuse prevention programs. However, the results of this study, which indicate no changes in drinking or smoking patterns after 15 weeks of exercise with a sample of university students, suggest that further research needs to be done in this area to determine the possible effects of alternative programs before they are presented as a panacea for preventing substance abuse in the schools and community.

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